

REMARKS

In view of the above amendments and the following remarks, Applicant requests favorable reconsideration and allowance of the above-identified application.

Claims 1-3, 6, 8 and 9 are now pending in this application, with Claims 1, 8 and 9 being independent. By this Amendment, Applicant has canceled Claim 5 and amended Claims 1, 8 and 9.

The drawing stand objected to as failing to comply with 37 C.F.R. 1.84(p)(5) because they allegedly do not include reference numeral 7 for a metal mold, which is discussed in the specification. Applicant submits that metal mold 7 is clearly shown in Figures 3B and 5. Consequently, Applicant requests withdrawal of this objection.

Claims 2 and 3 stand objected to because of informalities. In particular, the Office Action states that the phrases “a projection area,” recited in Claim 2, and “the reduction in the optical performance caused by manufacturing imperfections,” recited in Claim 3, are unclear.

With respect to Claim 2, Applicant submits that one of ordinary skill in the art would understand “a projection area” to mean a projection area about a main axis of the optical element.

With respect to Claim 3, Applicant submits that a “manufacturing imperfection” can readily be measured through actual manufacturing or a predictive simulation. Further, quantification of such an imperfection is possible by comparison of a measured or predicted value with a designed value. Applicant also submits that one of

ordinary skill in the art could readily quantify and compare measured or predicted values with a designed value. Therefore, Applicant submits that the relevant phrase of Claim 3 is not unclear.

Accordingly, Applicant requests withdrawal of the objections to Claims 2 and 3.

Claims 1, 2, 5, 6 and 8 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-4 of Canon's copending Application No. 09/401,660. Applicant requests that this rejection be held in abeyance until the claims are otherwise indicated as being allowable.

Claims 1-3, 5, 6 and 8 stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,847,877 (Imamura, et al.) in view of U.S. Patent No. 5,496,616 (Harris) and Japanese Patent Laid-Open Application No. 10-123388 (Hiroshi). Claim 9 stands rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,214,535 (Harris, et al.) in view of Hiroshi. Applicant traverses these rejections.

As recited in independent Claim 1, Applicant's invention is directed to a diffractive optical element having a first diffractive optical part having a phase-type diffractive grating, and a second diffractive optical part having a phase-type diffractive grating, formed of a material different from that of the first diffractive optical part. Each of the first and second diffractive optical parts has a mark for aligning them, with the mark being formed in an area where the diffractive grating is provided. In addition, the depth of the mark is 10% or less of the depth of the diffractive grating of a corresponding diffractive optical part.

Independent Claim 8 is directed to a method of manufacturing a diffractive optical element. That claim recites features generally similar to those recited in independent Claim 1.

Independent Claim 9 is directed to a metal mold for manufacturing a diffractive optical element. The mold includes a first area for molding a phase-type diffractive grating and a second area for molding a mark. The second area for molding a mark is provided in the area for forming the diffractive grating molded by the first area. In addition, the depth of the second area for molding the mark is 10% or less of the depth of the first area for molding the diffractive grating.

Harris and Harris, et al. are cited in the Office Action as describing aligning diffractive gratings. Applicant, however, submits that these documents do not describe aligning diffractive optical parts using marking formed in areas where a diffractive grating is actually formed. Also, the Office Action does not assert that such markings are described in those patents.

Imamura, et al. is merely cited as describing the use of first and second diffractive optical parts formed of different materials, with those diffractive optical parts being accumulated with a space therebetween. Again, the claimed markings are not described in this patent.

Hiroshi is cited in the Office Action as describing alignment markings. Specifically, the Office Action refers to parts 21a and 22a, in Figure 2, as showing alignment markings. As described in that patent, part 21a is concave in shape, while part 22a is convex in shape. Lenses 21 and 22 are positioned by engaging part 21a and part

22a. However, no space is provided between lens 21 and lens 22. Also, Applicant submits that the lenses do not include diffractive gratings. Thus, that document does not describe providing a mark in an area in which a diffraction grating is provided, for two diffractive optical parts, where the diffractive optical parts are disposed with a space therebetween. Again, the claimed markings are not described in this patent.

In addition, because parts 21a and 22a are not formed in areas including diffractive gratings, Hiroshi does not describe the depth of the mark relative to the depth of the diffraction grating. Thus, Applicant submits that that document does not suggest forming a mark in an area of a diffractive grating, and having the depth of the grating be 10% or less of the depth of the grating.

Furthermore, in Hiroshi, the positioning of lens 21 and lens 22 is performed by physically engaging part 21a and part 22a. A typical diffraction grating has a depth on a wavelength order. Applicant submits that a mark that is 10% or less of that depth would unlikely provide for sufficient physical engagement between two lenses.

Accordingly, Applicant submits that Harris, Harris, et al., Imamura, et al. and Hiroshi, taken alone or in combination, fail to disclose or suggest at least the features of (i) each of a first diffractive part and a second diffractive optical part having a mark for alignment, wherein the mark is in an area where the diffractive grating is provided, and the depth of the mark is 10% or less of the depth of the diffractive grating, as recited in independent Claim 1; (ii) aligning a first diffractive optical part and a second diffractive optical part which each other while observing a mark present in an area where the diffractive grating is provided, wherein the depth of the mark is 10% or less of the depth of

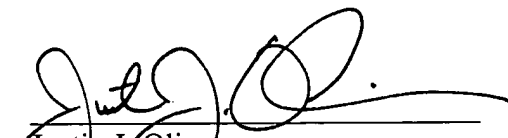
the diffractive grating, as recited in independent Claim 8; and (iii) a second area for molding a mark for aligning a diffractive grating with another member, the second area being provided in an area for forming a diffractive grating molded by a first area, wherein the depth of the second area for molding the mark is 10% or less of the depth of the first area for molding the diffractive grating, as recited in independent Claim 9.

For the foregoing reasons, Applicant submits that the independent claims are allowable over the applied documents, and requests withdrawal of the rejections under 35 U.S.C. § 103.

The remaining claims in the present application are dependent claims which depend from the independent claims, and thus are patentable over the applied documents for reasons noted above with respect to those claims. In addition, each recites features of the invention still further distinguishing it from the applied patents. Applicant requests favorable and independent consideration thereof.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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